LAIKIPIA UNIVERSITY

UNIVERSITY EXAMINATIONS

1ST SEMESTER 2023/2024 ACADEMIC YEAR

THIRD YEAR EXAMINATION FOR THE DEGREE OF BACHELOR OF SCIENCE IN ECONOMICS & STATISTICS

ECON 313: ADVANCED MICRO ECONOMICS

STREAM: *ECON STAT* ***TIME: 2 HRS***

DAY: TUESDAY [8.30-10.30 A.M] ***DATE: 5/12/2023***

THIS QUESTION PAPER CONSISTS OF THREE (3) PAGES

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INSTRUCTIONS:
Answer QUESTION ONE and any other TWO questions
Question One carries 30 marks and the rest 20 marks each.

QUESTION ONE

Write brief notes on the following concepts. Be precise as you can.

i) Optimization and equilibrium; **(6 marks)**
ii) Net-Put vector; **(6 marks)**
iii) Shepherd`s Lemma; **(6 marks)**
iv) Marginal Rate of Technical substitution; **(6 marks)**
v) Stackelberg Equilibrium. **(6 marks)**

QUESTION TWO

A maize farmer produces using two inputs Labour (L), and fertilizer (K). The farmer`s profit function is given by $\pi = \frac{p^2}{\sqrt{wr}}$

Where; *P* is price of maize per bag;
r and *w* are the unit prices of fertilizer and labour respectively.

Fertilizer is measured in 1 kg bag while labour is measured in Man hours. A legitimate profit function is convex and positively linearly homogeneous in both input and output prices.

i) Is the above function legitimate? Show your working. **(10 marks)**
ii) If maize sells at Kshs. 500 per bag, Labour costs Kshs 100 per hour and fertilizer cost Ksh 25 per bag, determine the number of bags of maize that will maximize the farmer`s profit. How much will this farmer spend on both labour and fertilizer? **(10 marks)**

QUESTION THREE

a) Highlight five properties of the cost function. **(5 marks)**
b) Suppose that a firm`s production function is given as $2x_1^{0.5}x_2^{0.4}$
Where x_1 and x_2 are two inputs. Derive the corresponding cost function. **(15 marks)**

QUESTION FOUR

Consider the following consumers` expenditure function $E(P,U) = UP_1^{\alpha}P_2^{1-\alpha}$
Where 1 *P* and 2 *P* are the prices for two goods 1 *P* and 2 *P* respectively, and U is utility.

i) State and derive the Slutsky`s equation. **(10 marks)**
ii) Given the expenditure function above, demonstrate the Slutsky`s equation. **(10 marks)**

QUESTION FIVE

a) A long run Average cost function for each firm in a competitive industry is given as:

$$C(q) = \frac{q^2}{3} - 2q + 13$$

where q represents output.
The market demand for the product is given as q =1250 - 50 p,
Where p is the unit price of output in shillings

i) Determine the equilibrium output for each firm in the industry. **(2 marks)**
ii) What is the optimal number of firms in this industry? **(2 marks)**
iii) Suppose a quantity tax of Ksh 6 is imposed in the market, what will be the optimal number of firms in the industry? **(2 marks)**

b) A duopoly industry faces a linear inverse demand function given by P=100-Y,
Where $Y = Y_1 + Y_2$,
Y_1 and Y_2 are the outputs by firms 1 and 2 respectively.
The cost function for the two firms are $C_1 = 100Y_1$ and $C_2 = \frac{Y_2^2}{2}$

i) Suppose firm 1 is the quantity leader, find the equilibrium price, quantities in theindustry. (4 marks)
ii) Suppose firm 1 is a price leader, how would the answers in (i) above change. **(4 marks)**
iii) Suppose the two firms colluded to maximize their joint profits, how much would each produce, and at what price would profits be maximized? **(6 marks)**